

N-Channel 100 V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on),max}$ (m Ω)	I_D (A)
100	1.5 @ $V_{GS} = 10V$	330 ⁽¹⁾

Features

- For automotive applications and AEC-Q101 qualified
- Great FOM (figure of merit) with low $R_{DS(on)}$ trench technology
- Fast switching speed
- 100% avalanche tested. High avalanche ruggedness

Applications

- DC/DC conversion
- Power switch
- Motor drives

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Package and ordering information

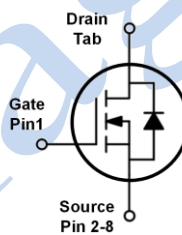
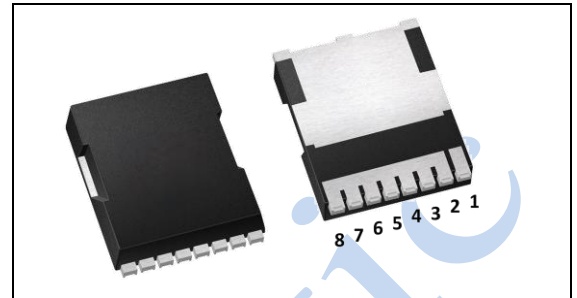
Ordering code	Package	Device code
SDA10N1P5T-AA	TOLL	AJP

1. Maximum ratings

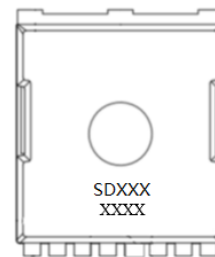
Absolute maximum ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	100	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current	$T_C = 25^\circ\text{C}$ ⁽¹⁾	I_D	330	A
	$T_C = 100^\circ\text{C}$		283	
	$T_A = 25^\circ\text{C}$ ⁽⁴⁾		34	
Pulsed drain current ⁽²⁾		$I_{D,pulse}$	1320	
Avalanche energy, single pulse ⁽³⁾		E_{AS}	1800	mJ
Power dissipation	$T_C = 25^\circ\text{C}$	P_D	517	W
	$T_A = 25^\circ\text{C}$ ⁽⁴⁾		3.7	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 175	$^\circ\text{C}$

TOLL



RoHS
COMPLIANT
HALOGEN
FREE



SDXXX
└─ Device code
 Silicon Magic discrete device

XXXX
└─ Wafer lot number
 Work week code
 Year code

2. Thermal resistance ratings

Thermal resistance ratings						
Parameter		Symbol	Max.	Unit		
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	0.29	°C/W		
Thermal resistance, junction-to-ambient ⁽⁴⁾	Steady state	$R_{\theta JA}$	40			

3. Electrical characteristics

Electrical characteristics (T _J = 25°C unless otherwise noted)						
Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Static parameter						
Drain to source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 1 mA	100			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.2	3	3.8	V
Gate-body leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = 100 V, V _{GS} = 0 V			1	μA
Drain-source on-resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 100 A		1.1	1.5	mΩ
Forward transconductance ⁽⁵⁾	g _{fs}	V _{DS} = 5 V, I _D = 100 A		260		S
Gate resistance	R _g	f = 1 MHz		1		Ω
Dynamic ⁽⁵⁾						
Total gate charge	Q _g	V _{DS} = 50 V, I _D = 100 A, V _{GS} = 10 V		260		nC
Gate-source charge	Q _{gs}			75		
Gate-drain charge	Q _{gd}			76		
Turn-on delay time	t _{d(on)}	V _{DS} = 50 V, I _D = 100 A, V _{GS} = 10 V, R _{GEN} = 6 Ω		81		ns
Rise time	t _r			178		
Turn-off delay time	t _{d(off)}			167		
Fall time	t _f			68		
Input capacitance	C _{iss}	V _{DS} = 50 V, V _{GS} = 0 V, f = 1 MHz		15800		pF
Output capacitance	C _{oss}			1930		
Reverse transfer capacitance	C _{rss}			75		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V _{SD}	V _{GS} = 0 V, I _F = 100 A		0.85	1.1	V
Reverse recovery time	t _{rr}	V _{DS} = 50 V, I _F = 100 A, di/dt = 100 A/μs		92		ns
Reverse recovery charge	Q _{rr}			200		nC

Notes

- (1) Package limited.
- (2) Pulse width limited by maximum junction temperature.
- (3) $V_{DS} = 75\text{ V}, V_{GS} = 10\text{ V}, L = 0.3\text{ mH}$.
- (4) $R_{\theta JA}$ is determined with the device mounted on a 1 in² pad 2 oz copper pad on a 1.5x1.5 in. board of FR-4 material.
- (5) Guaranteed by design, not subject to production testing.

4. Electrical characteristics diagrams

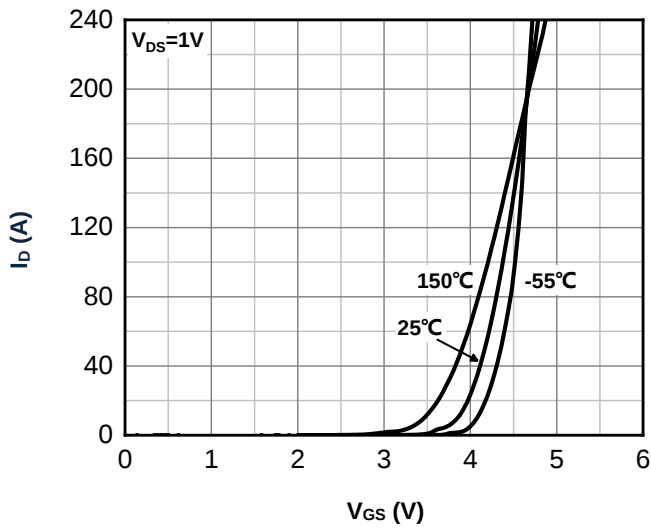
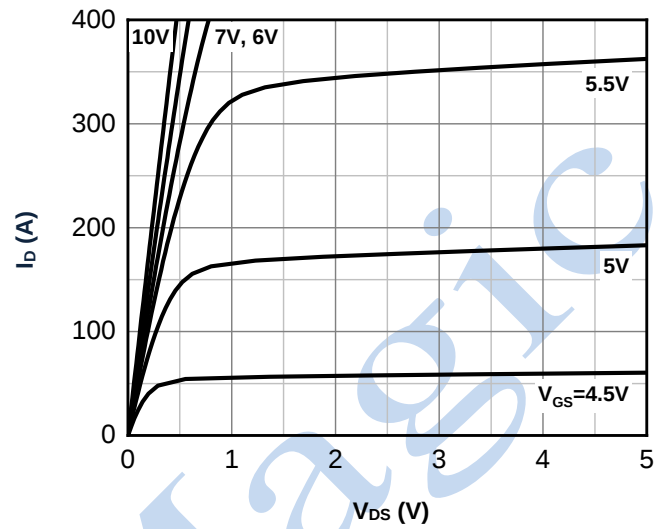
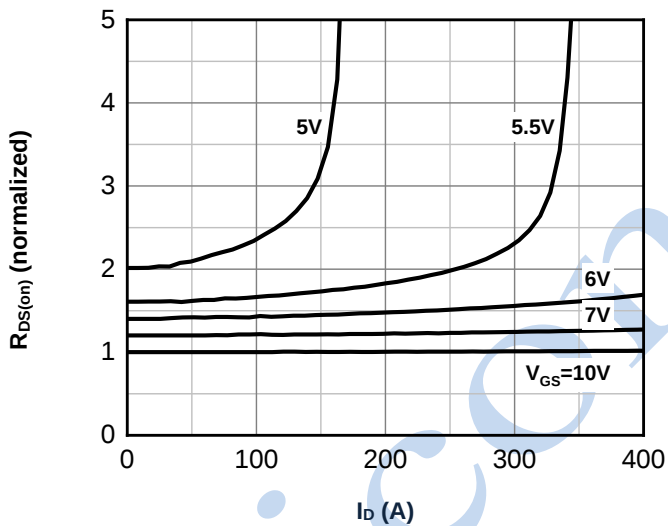
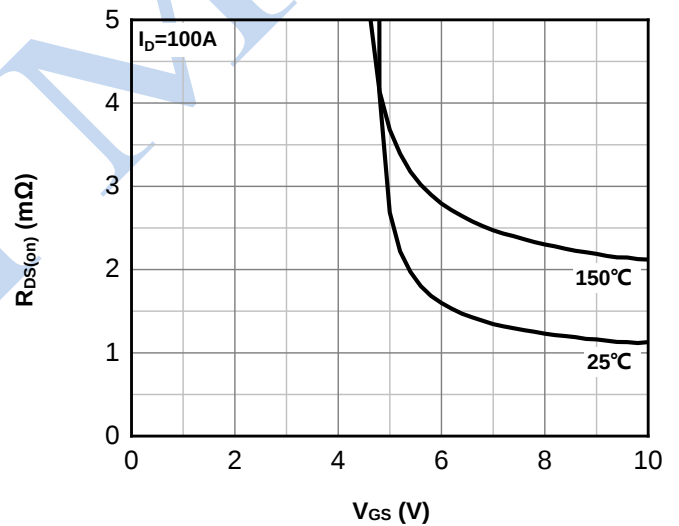
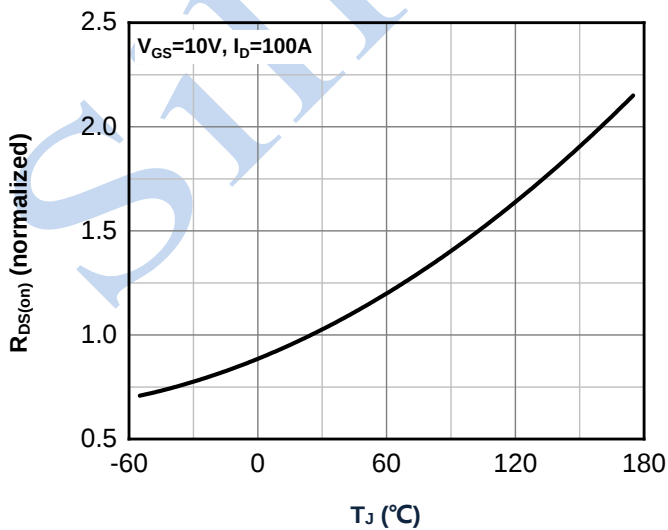
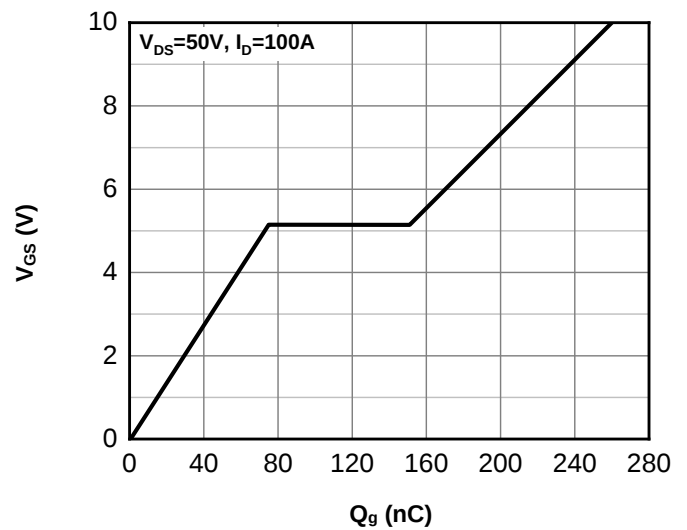
Fig.1 Typ. transfer characteristics

Fig.2 Typ. output characteristics

Fig.3 Normalized on-resistance vs drain current

Fig.4 Typ. on-resistance vs gate-source voltage

Fig.5 Normalized on-resistance vs junction temperature

Fig.6 Typ. gate charge


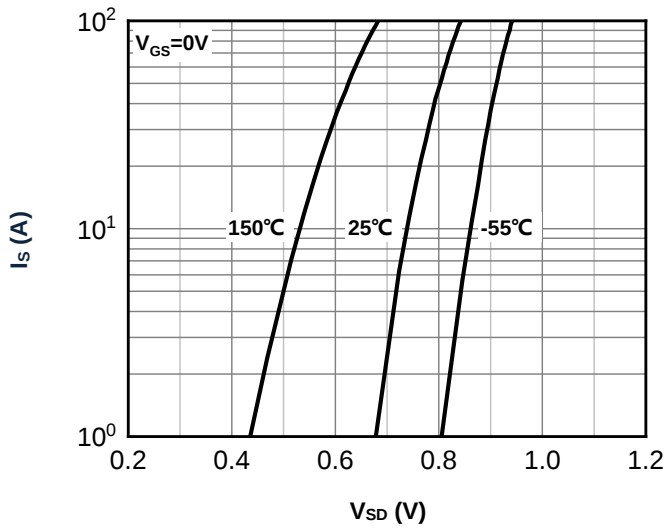
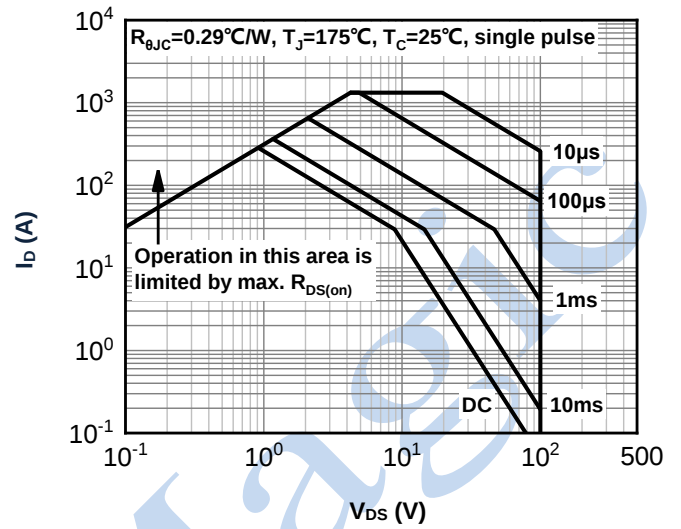
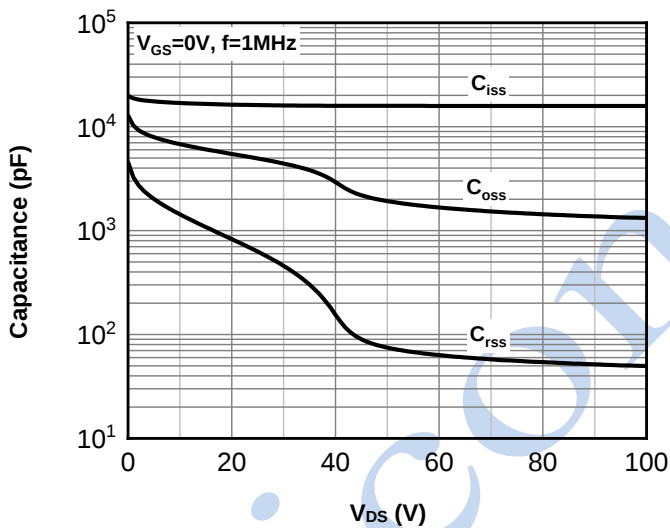
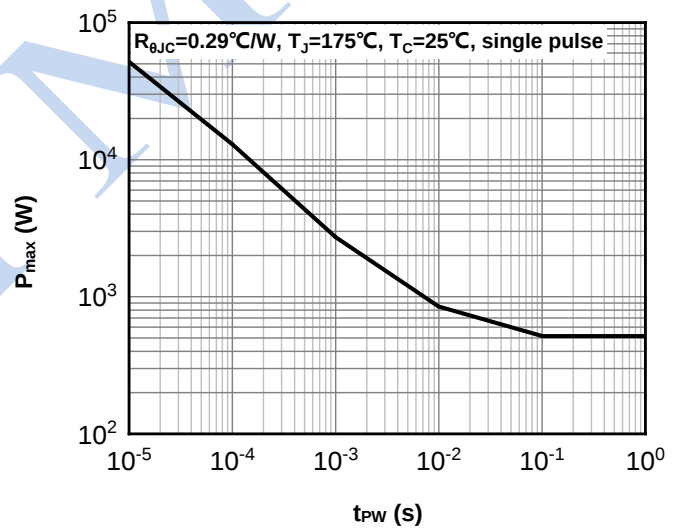
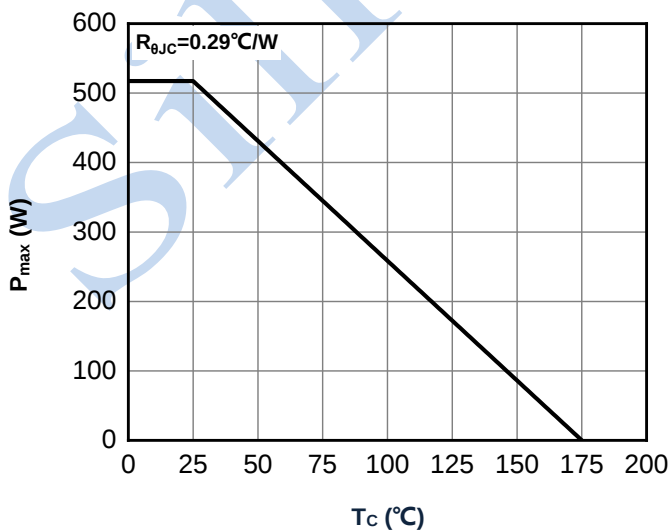
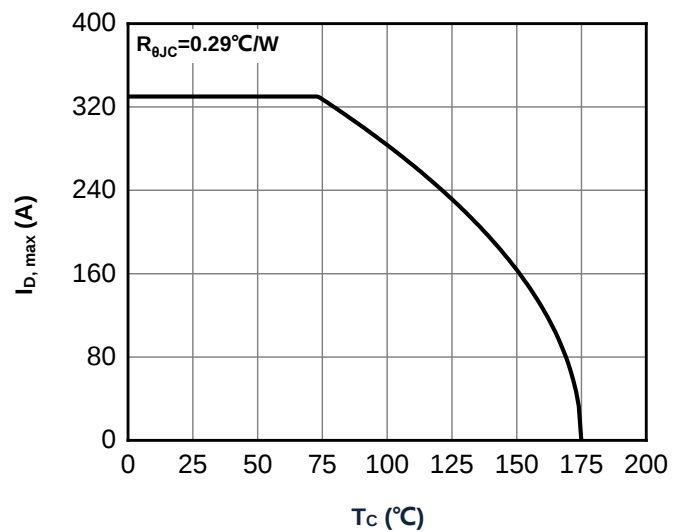
Fig.7 Typ. forward characteristics of body diode

Fig.8 Safe operating area

Fig.9 Typ. Capacitance

Fig.10 Single pulse maximum power dissipation

Fig.11 Max. power dissipation vs case temperature

Fig.12 Max. continuous drain current vs case temperature


Fig.13 Normalized $V_{(BR)DSS}$ vs junction temperature

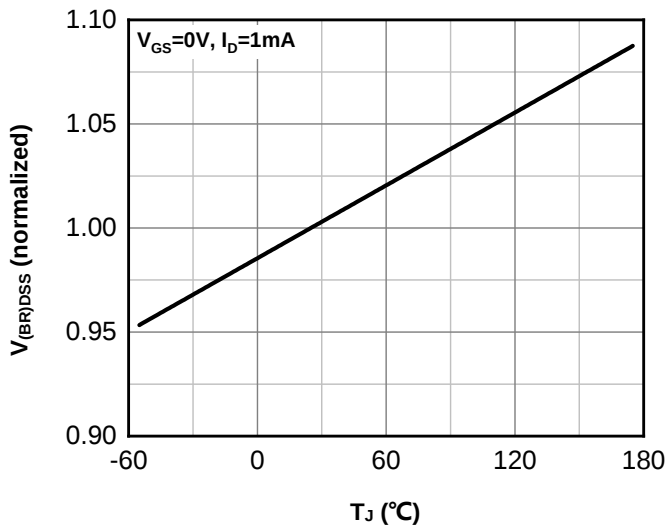


Fig.14 Normalized $V_{GS(th)}$ vs junction temperature

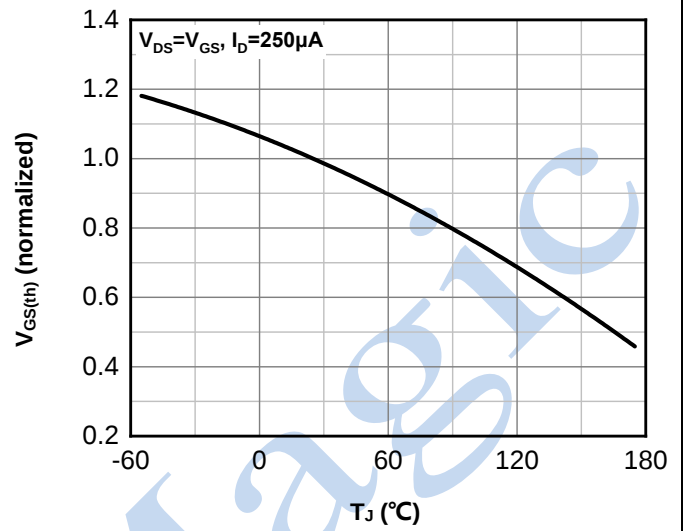
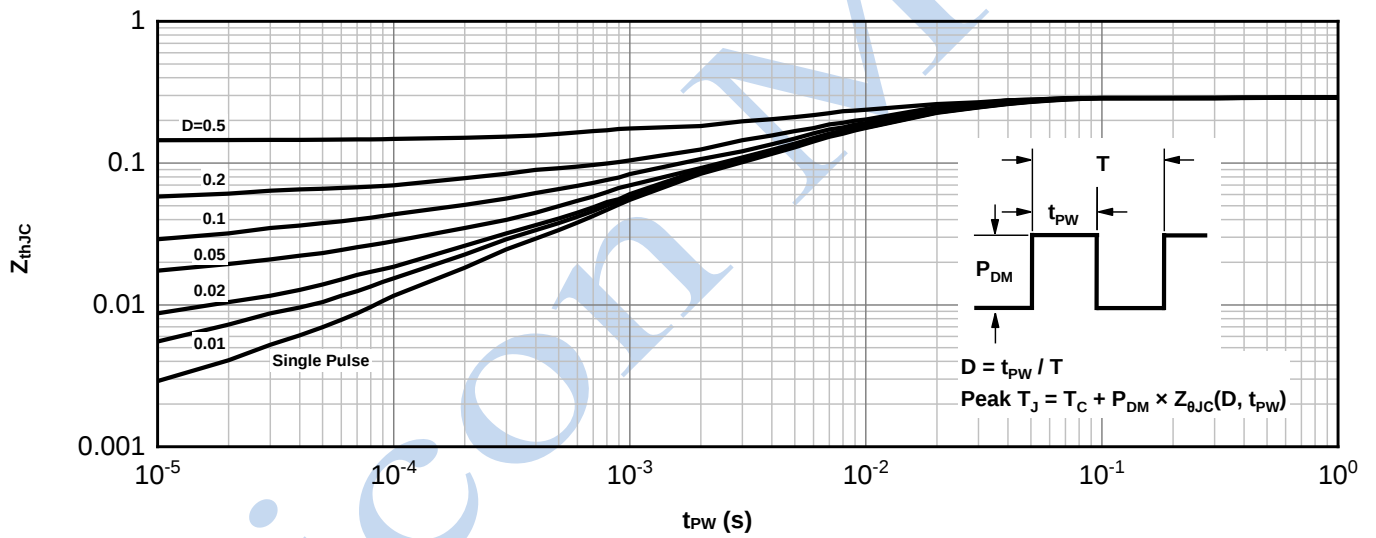
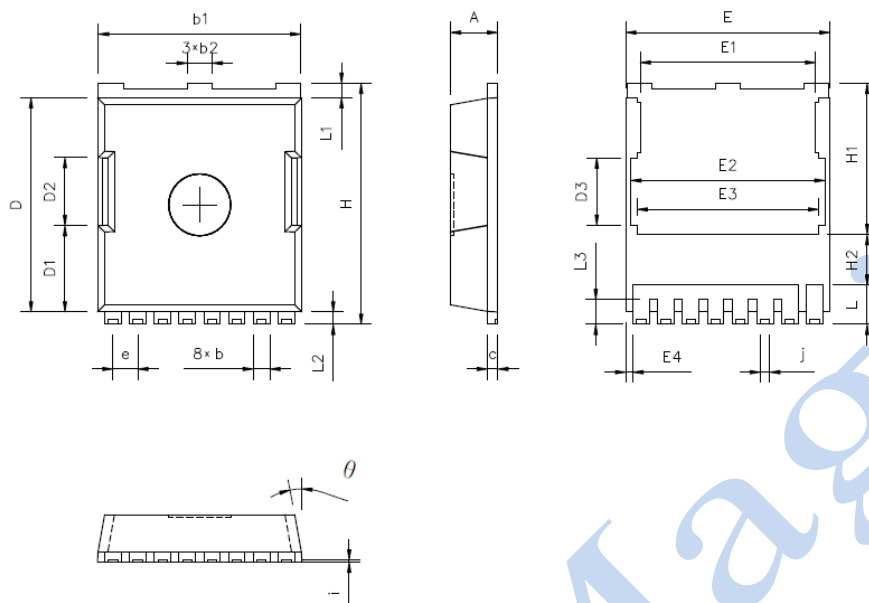


Fig.15 Transient thermal impedance from junction to case



5. Package outline dimensions



Dim	Millimeters		
	Min	Nom	Max
A	2.20	-	2.40
b	0.70	-	0.90
b1	9.70	-	9.90
b2	1.20 REF		
c	0.40	-	0.60
D	10.28	-	10.48
D1	4.08	-	4.28
D2	3.20	-	3.40
D3	3.16	-	3.36
E	9.80	-	10.00
E1	8.40	-	8.60
E2	9.30	-	9.50
E3	8.80 REF		
E4	0.25	-	0.45
e	1.20 BASIC		
H	11.58	-	11.78
H1	7.23	-	7.43
H2	2.45 REF		
i	0.10	-	-
j	0.45 REF		
L	1.60	-	2.10
L1	0.60	-	0.80
L2	0.50	-	0.70
L3	1.05	-	1.30
θ	10° REF		

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